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MANNING U.S. STRATEGIC SEALIFT IN THE YEAR 2000

by

Mark R. Lenci

Commander, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: Mark R. Lenci
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Paper directed by Professor Andrew E. Gibson Professor,
National Security and Decision Making Department

Approved by:

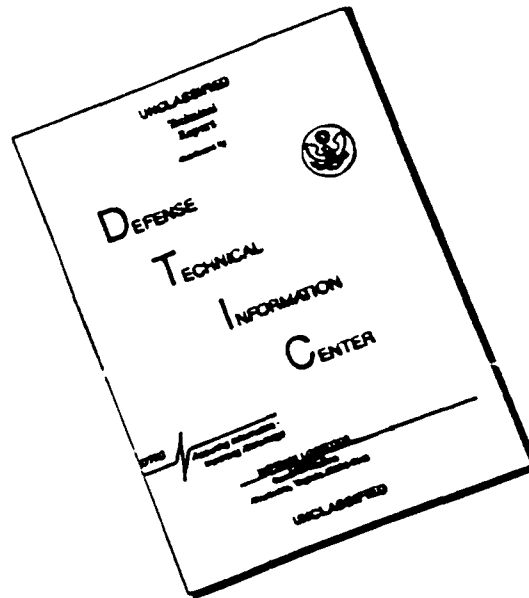
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Abstract of

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This paper examines the estimated capability of the United States in the year 2000 to man U.S. controlled strategic sealift assets that would be required for an operation of the size, pace, and limited national mobilization used in Desert Shield and Desert Storm.

The scope of this paper includes manning the ships held in reduced operating status (ROS) by the Military Sealift Command and the ships of the Ready Reserve Force (RRF) maintained by the Maritime Administration. Figures as of March 1991 for the activation and manning of ROS and RRF ships for Desert Shield/Storm are used for estimates of manning requirements.

The paper concludes that using the most optimistic case, it will be very difficult to man the projected ROS/RRF fleet with qualified mariners during the initial surge of deployment and the available manpower will provide at best 80% of the requirement on a sustained basis.

The paper discusses possible options to avert the manning shortfall and concludes that a combination of several options is the best course.

- (1) Use special purpose military cadres to augment the merchant marine base crew as is done now on a more limited basis.
- (2) To reduce crew size and keep current with the available commercial engineering personnel's expertise, buy only diesel propelled, modern vessels to complete the RRF enlargement presently authorized and replace ships found in marginal condition.
- (3) Maintain the RRF ships in reduced operating status with some individual skeleton crews and some crews for a cluster of ships.
- (4) Implement a merchant marine civilian reserve system.

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ACKNOWLEDGMENT

This paper uses the most current data available for Operations Desert Shield and Desert Storm. This data was obtained primarily through direct contact with the operational agencies. Their help in this project during this a time of great demand for their services is very much appreciated.

I would like particularly to acknowledge the help of the Maritime Administration (MARAD) for their assistance in my research. The Norfolk office, through hours of conversation, provided valuable insight into the nature and material condition of the Ready Reserve Force. This office also helped in my understanding of the nature of the lay-up, maintenance, and activation processes for RRF ships. The MARAD Office of Maritime Labor and Training provided much current and comprehensive data on the use of the RRF in Operation Desert Storm and Desert Shield. The Public Affairs Office of the Military Sealift Command also provided important help in response to many phone calls and in assembling data from several offices within MSC. Their assistance was also valuable in arriving at meaningful interpretations of the complex data provided.



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MANNING U.S. STRATEGIC SEALIFT IN THE YEAR 2000

CHAPTER I

INTRODUCTION

The Role of Sealift

The collapse of the Warsaw Pact and the apparent reduction of the Soviet threat has caused the United States to reassess its global strategy. The strategy is shifting from containment to the ability to project power selectively. As the Soviet menace recedes, forces overseas will be reduced and the role of sealift in national defense will become more vital.

Operations Desert Shield and Desert Storm (from now on called simply Desert Storm) used all of the viable capabilities of U.S. sealift that are available without national mobilization. This lift moved approximately 95% of the material required for the operation. As of the end of March 1991, this force included: all 3 squadrons of Maritime Prepositioning Ships (MPS, 13 ships in 3 squadrons each with equipment for a Marine Expeditionary Brigade); all but one Afloat Prepositioning Ship (APS, these carry various cargos to support primarily Army and Air Force needs and also a Navy field hospital); activating all 8 Fast Sealift Ships (FSS), 2 hospital ships, and 2 aviation support ships held in reduced operating status, and the activation of 78 ships of the Ready Reserve Force (RRF). Additionally many US and foreign flag ships were chartered from the commercial market for various periods of time.

The Problem

The objective of this study is to examine the United States' ability to man the reduced operating status (ROS) ships and the projected RRF with qualified mariners in the year 2000. The paper is significant because as will be shown, the US will not have the ability to provide enough mariners for *existing and authorized ships* required to support a sealift effort for an operation on the scale and pace of Desert Storm in the year 2000. This requires that measures be taken now if a mariner shortfall is to be avoided.

The paper will examine the projected requirement for manpower, the availability of mariners to meet those requirements, discuss options to decrease the requirements or increase the availability, and propose a possible course of action.

The Limitations on Research

Desert Storm was still an ongoing operation at the time of the writing of this paper. The sealift effort is now engaged in the withdrawal of forces from Southwest Asia and sustaining the remaining forces until their ultimate withdrawal. It is certain that no more RRF ships will be activated and that the manning of the activated ships will remain as stated. However, data on the charter of commercial ships will change as more cargo is shipped by regular liner service. Therefore there is bound to be minor changes in vessel utilization.

The "charter" of a commercial vessel is sometimes misleading because this term has been used liberally in the press to mean the shipment of any cargo by regular liner, whether an entire ship was chartered or not. This can mean that only a portion of the ship's capacity was used for military cargo, e.g., one hold or a portion of the container capacity. Further MSC reports that the overwhelming majority of the commercial charters have been only for one, one-way trip, and not on a long term basis. Thus a

quantitative analysis of how much cargo was shipped by commercial charter and how many full ships that equates to is not yet available.

The data provided by MSC was compiled from several different sources within MSC and is still "preliminary." It is believed that any changes in the final form of the pertinent information (if it is ever available) will also not materially influence the results of the analysis.

The Commission on Merchant Marine and Defense

The Commission on Merchant Marine and Defense (COMMAD) was established by public law in October, 1984. Its mission was "to determine whether the nation has access to sufficient sealift resources to carry out the defense strategy, should the need arise."¹ COMMAD held hearings and studied the issues. Four reports were issued. The third report was titled: "Findings of Facts and Conclusions." This report is used extensively for data in this paper.

The Commission's conclusions and recommendations are subject to debate. Yet in spite of this it is widely acknowledged as the most comprehensive and authoritative study available.

II. THE MANNING REQUIREMENT

This paper examines the manning requirement for the RRF and ROS ships in the year 2000. To estimate the required manning, the RRF is further divided into those ships activated for Desert Storm, those not activated, and ships that are authorized to be procured to expand the RRF.

Desert Storm Actual Manning Requirements for ROS and RRF Ships

The actual manning data used for the ROS and RRF ships activated for Desert Storm was obtained from MSC* and MARAD**. The numbers below are the number of mariners hired from the available labor pool. For the RRF ships, this was the total crew. For the ROS ships, this number is the crew members hired on in addition to the ROS (skeleton) crew, i.e., the ROS crew did not come from the labor pool since they already are hired. A detailed accounting by ship is provided for ROS ships in appendix B-1 and RRF ships in appendix B-2.

<u>RRF:</u>	<u>Crew:</u>
78 ships activated:	2,533
<u>ROS:</u>	
8 Fast Sealift Ships:	240
2 Aviation Support Ships:	58
2 Hospital Ships (Mariners only):	102
-----	-----
total:	2,933

Note that this is the number of mariners required to fill exactly the number of open billets. The effect of additional mariners required to sustain the fleet manning after the initial surge will be discussed later.

* MSC data was provided by the public affairs office of MSC by telephone in response to my inquiries on 8 and 17 April, 1991 and is current as of those dates.

** MARAD data was provided by MAR-250 as an internal report dated 8 March, 1991, of RRF manning.

The manning requirements for most ships of the RRF including the 19 that were not activated for Desert Storm is available in an appendix to the Third Report of COMMAD. The information provided by MARAD and MSC for the actual Desert Storm manning by billet on each activated RRF ship is compared to COMMAD's listing of required manning in appendix B-2. It is obvious that the manning numbers provided to COMMAD did not reflect reality for over half the ships. It is important also to note that the additional personnel required above the COMMAD estimate were primarily licensed and unlicensed engineering personnel. This has significant implications in later discussions on the required skills of the mariners who will man the RRF.

Requirements for RRF Ships not activated

The second portion of the required RRF manpower is the mariners that would be required for the 19 ships of the RRF that were not activated for Desert Storm. To estimate this, several assumptions are made. First, there are two troop ships in the 19 RRF ships not activated. It is assumed that these ships will not be activated in future conflicts. All troops were airlifted, mainly by chartered civilian airliners, in Desert Storm. This worked well and seems viable for future operations. Secondly, for the remaining 17 ships, the required number of mariners from COMMAD needed to be adjusted to reflect the experience of Desert Storm. This was done by using the actual Desert Storm numbers for similar ships. The RRF ships were often bought as "bargains," or less charitably, as "scrap candidates" in groups from commercial carriers. Therefore Desert Storm crew sizes for ships of the same age, type, etc. were used. If there were no comparable, activated ships, the Third COMMAD number was adjusted up in the engineering department only. The result is that 530 mariners would be required to man the 17 ships.

Manpower Requirements for the Expanded RRF

The RRF presently has 97 ships. It is authorized but not funded to expand to 142 ships. It is assumed for calculating the manning requirement for the RRF that the force will actually expand by 45 additional ships.

Some assumptions must be made about the type of ships that will make up the 45 additional ships acquired for the RRF. It is assumed that they will be purchased from the open market and not built specifically for the RRF. MSC chartered 43 RO/RO ships (as of March 31, 1991) for Desert Storm. Public statements by VADM Donovan (MSC) and General Johnson (USTRANSCOM), and others suggest that RO/RO's for the movement of unit equipment (as opposed to sustaining supplies more suited to container or breakbulk ships) were the limiting factor in Desert Storm sealift.¹ It is therefore assumed that 35 of the 45 new RRF ships will be RO/RO and the remaining 10 will be breakbulk. A review of the crew of the 11 diesel propelled RO/RO ships activated for Desert Storm will give an estimate of the crew for future RO/RO ships. The steam propulsion RO/RO ships had significantly larger crews and were not considered. The 11 diesel RO/RO's were built from 1972 through 1979. Their average crew size was 28.7 (the older, smaller ships having larger crews and the newer, larger ships having smaller crews). An average crew size of 21 for the 35 projected RO/RO's is assumed since they probably will be newer, 1980's vintage ships. Options for the reduction in crew size will be discussed later but a 21 man crew is a realistic number for requirements as they now exist.

It is assumed that the remaining 10 ships in the projected force also will be modern, diesel propulsion ships. There is no good comparison in the existing RRF since there are no diesel ships other than the 11 RO/RO's. The overwhelming majority of the RRF breakbulk ships were built in the sixties and have crew sizes in the low 30's. If the future RRF ships are about 10

years old, i.e., 1980 vintage, a reasonable number for a US crew also will be 21. This gives a total manning of the projected RRF expansion of:

Ships:	Crew:
35 RO/RO's with 21 man crews:	735
10 other ships with 21 man crews:	210
-----	-----
45 total:	945

Surge Manning

The summary of the manning required to activate the ROS ships and the projected Ready Reserve Force is:

Ships activated for Desert Storm:	2,933
(actual numbers for MSC ROS ships, and 78 RRF ships)	
Remaining RRF ships not activated for Desert Storm (adjusted):	530
Projected RRF expansion (estimated)	945
-----	-----
total:	4,408

This number is the "surge" or initial manning base crew requirement for a come-as-you-are war. This is the Desert Storm scenario. It is *not* a complete national mobilization for global war. The global war scenario would greatly expand the requirement by probable mobilization of the National Defense Reserve Force (NDRF), new construction, nationalization of assets and would increase the available pool of mariners through complete mobilization. This is beyond the scope of this paper. This paper plans for limited mobilization and deployment of a 500,000 person force like Desert Storm.'

This estimated number does not include any special crews required for military features of the ships. The 8 crane ships of the RRF, designed to offload themselves and other ships in ports without cargo handling

* Desert Storm deployed 5 Army divisions, 2 Marine divisions, 14 USAF squadrons, 6 aircraft carriers & supporting ships, and supporting troops totalling about 540,000 U.S. personnel at its peak.

facilities, have specially trained military cadres to man the unique handling equipment. None of these ships utilized their unique ability during Desert Storm although some were activated. The estimated number does not include significant additional manning required for sealift enhancements capable of being added to some ships for underway replenishment (UNREP) and special cargo handling (see appendix A). Similarly the 1200 medical personnel on each hospital ship are not included.

Sustained Manning

The 4,408 mariner billets are the number required to fill the billets in a 1 to 1 ratio during the initial phase of deployment. This number will be called the surge manning requirement. More mariners will be required in the "sustainment" phase of the deployment, i.e., after the first 3-4 months, and for returning the force back to its point of origin after the crisis. Just as in the Navy, these mariners will not stay at sea indefinitely, especially if only a small scale mobilization occurs. The World War II manning ratio used by COMMAD and other studies shows that 1.5 mariners will be required per shipboard billet during the sustainment phase.² During this phase, the 1.5 ratio will apply to the MPS and APS ships and also for the nucleus ROS crew for the ROS ships. These mariners will all come from the same labor pool. The sustainment requirement for MPS and APS ships will not be added to the sustainment number because this goes on continuously for these ships even when not mobilized. It is mentioned only to highlight the second order effects of the sudden demand on the mariner labor pool. However the additional mariners required to sustain the nucleus crew portion of the ROS ships will be included.

The sustainment manning requirement is:

ROS nucleus crew sustainment:	72
(12 per FSS, 7 per Aviation Support Ship & 17 per hospital ship) X .5	
Surge Manning X 1.5 (4,408 X 1.5)	6,612
(includes RRF & ROS crew <i>except</i> the nucleus crew)	
-----	-----
Sustained Manning Requirement	6,684

III. MARINER AVAILABILITY

The Mariner Pool in the Year 2000

The estimate of available mariners in the year 2000 that is calculated from a ratio of mariner that have historically been available for each existing billet in the US flag fleet. The primary source for this ratio and the fleet size is the Third COMMAD Report.

The size of the US flag fleet is declining. It consisted of 409 ships in 1988. The Third COMMAD, with the help of the Maritime Administration, Navy, Coast Guard, Military Sealift Command, and maritime industry personnel estimated that the fleet in the year 2000 will consist of 217 ships. This assumes the "continuation of current government maritime policies, including non-renewal of current ODS (Operating Differential Subsidies) contracts and the absence of ODS reform".¹ The COMMAD analyzed these ships and current maritime trends to arrive at a total billet structure of 5940 billets, or an average of 27 per ship in the year 2000.² Note that the total number was not calculated by an average per ship but by looking at each ship and projecting current ship manning trends. The 27 per ship average is still a useful number for later discussions on crew size options.

The COMMAD uses a ratio of 2 mariners in the total mariner pool for each seagoing billet on a US flag vessel.³ This would give a total pool of 11,880 mariners. This figure will be used. An independent study commissioned by MARAD estimates this number at only 10,800 in the year 2000, which using the 2:1 ratio with 217 ships, gives an average crew size of 25.⁴ Thus the COMMAD figure used in this paper is conservative.

Actual Availability for Sea

The 11,880 figure, allowing for 5940 to man the commercial billets, leaves 5940 mariners in the pool. The COMMAD estimates that 90% of these

will be actually available to go to sea.⁵ The actual figures for Desert Storm are still being analyzed and are only partially available. Informal conversations with MARAD suggest that the availability varied widely between firms and associated unions that provided the crews to MARAD. Some initial observations are:

- *Mandatory drug testing delayed the procurement of crews due to processing time and may have inhibited some mariners from accepting billets.

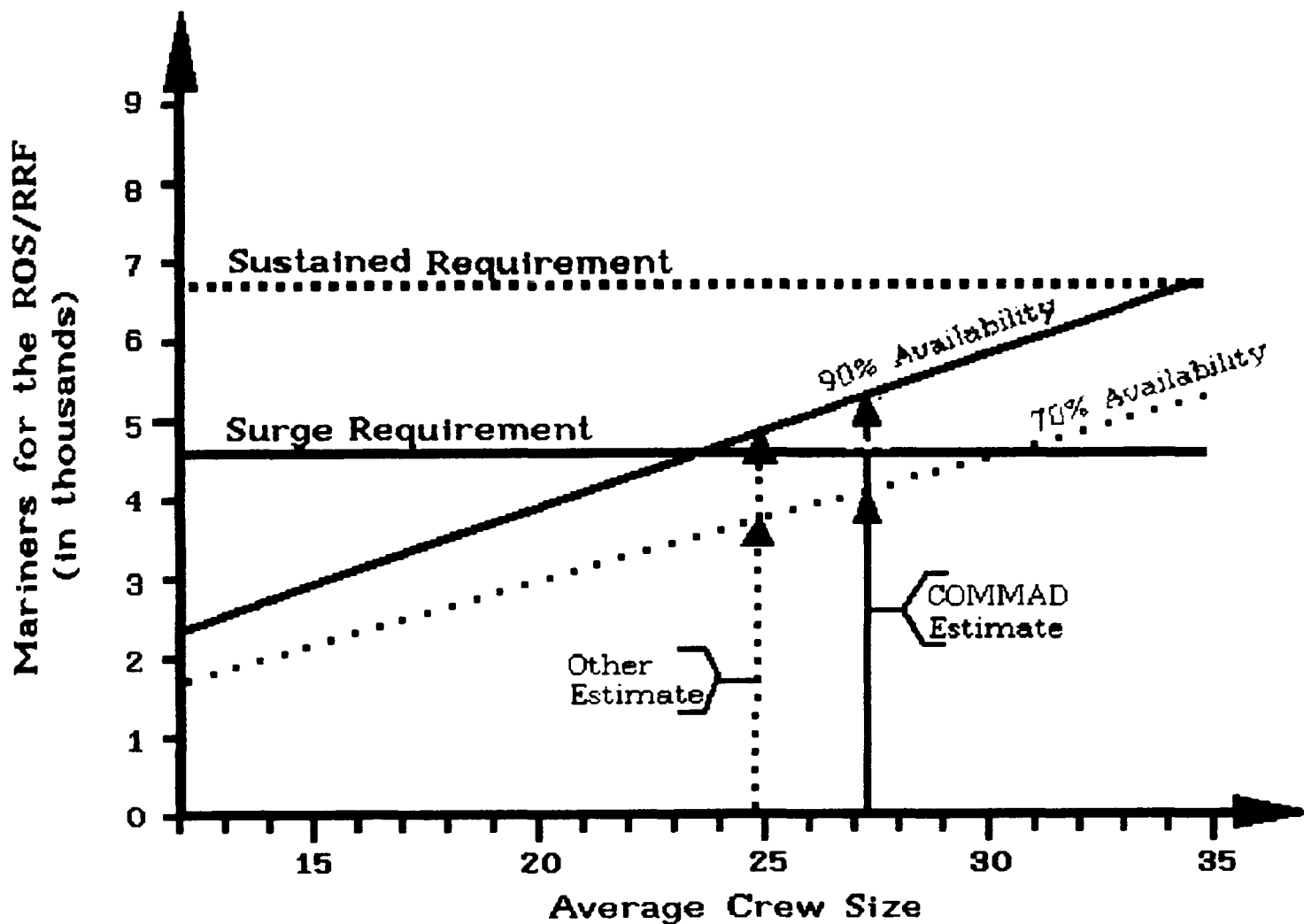
- *Job protection, similar to a military reservist called to active duty, was not available to merchant mariners.

- *A study commissioned by MARAD suggests that actual availability may have been as low as 60% under the conditions of Desert Storm.⁶

This paper will use a 90% availability. This means that the pool of mariners truly available in the year 2000 to meet manning requirements is 5346. Figure III-1 also shows the result if a 70% availability figure is used.

The graph below demonstrates that in the year 2000, the liberally estimated availability of mariners will just meet the conservatively estimated number of surge mariners required and will fall far short of the number of sustained mariners required. The 70% availability line shows that there is a shortfall even in surge manning under this assumption as does the more conservative manpower pool assumption (10,800 vice COMNAV's 11,800).

Predicted Mariner Availability & Requirements in the Year 2000



The Effect of Smaller Commercial Crews

Figure III-1 is constructed to show the ability to man the sealift fleet as a function of the average crew size of the US flag fleet. This is done because COMMAD has calculated the size of the pool of available mariners as a function of the billets in the active commercial fleet. It is felt that the Third COMMAD Report did not adequately address the impact of reduced crew sizes, i.e., fewer billets, on the manpower pool in the year 2000. Modern *automated diesel* ships in the US flag fleet run with crews that average between 21 to 23 people whereas the active older steam plants like those in the RRF run with crews of nearly 35 mariners. World wide trends show that with multi-role crews, automated engine rooms and bridges, diesel propulsion, reduced watch rotation, etc. that crews of 14 or smaller are possible. If one assumes that the US flag fleet will follow this trend to stay at all viable, although not as low as 14 man crews, figure III-1 shows the large shortfalls that will result from the reduced pool of available mariners. As the crew size of commercial ships decreases, the manning requirements for the existing RRF ships will remain constant since the ships.

It should be noted that this increased shortfall due to smaller crew size is not as severe as it initially might seem. The smaller crew size does not reduce each category of crew member equally. It affects primarily the unlicensed personnel and hardly affects the licensed personnel. A ship still needs a master, chief engineer, and most officers despite smaller crew sizes. Thus the reduced availability of mariners due to smaller crew sizes will most severely affect unlicensed personnel, primarily in engineering.

The Effect of Commercial Fleets Switching to Diesel Propulsion

Thus far this section has discussed available mariners only quantitatively. There are several qualitative considerations. First among

these is the impact of the switch to diesel propulsion in the active commercial fleets.

There will likely be very few steam propulsion plants left in the commercial fleet by the year 2000. The vast majority of the steam powered vessels will be well over 25 years old. To be commercially insured, ships must go in for yard inspections every four years. As steam ships face the 6th or 7th quadrennial inspection, the cost of repairing these older plants to meet insurance industry standards can easily be prohibitive. Most likely they will be scrapped and if replaced, replaced with diesel powered ships.

Diesel propulsion plants require less engineering personnel than the older steam plants. As diesel plants replace steam plants, this means there will be fewer engineers overall. Even if the maritime academies continue to train engineers in steam propulsion, the number of engineers with experience on steam plants will drop. There are no refresher courses for engineers to keep up their steam plant expertise nor any incentive to do so since there is little need in the industry for this.⁷ Further, whereas the "graying" (aging) of the mariner force in general may be debatable, the subset that includes experienced steam plant personnel will most certainly gray.⁸ The problem is further aggravated when one realizes all new acquisitions are diesel. Finally, Desert Storm shows that the R.F.F. steam plants often required more licensed engineers than the study allowed for. It appears that experienced personnel to operate steam plants will be an even more difficult group to obtain than the total force.

⁷ The Third Report of COMMAD states "By the year 2000, the vast majority of today's experienced merchant seamen will be over 65 years old" and points out that this is the group of mariners that will have the skills to operate steam plants. It does not specifically address the projected demographic data of the total active merchant marine. The Crewing Study for MARAD concludes that generally the active merchant marine is getting younger but does not address the issue of the subset with steam plant experience.

IV. POSSIBLE OPTIONS TO HELP THE PROBLEM

One thing is clear from the brief examination of this complex field; there is no single, simple solution. The interests of the mariners and their unions, ship owners, ship builders, the military, Congress, and others are difficult to reconcile, and in fact may be impossible. The paper approaches the review of options from the point of view of national security alone in that it seeks to insure the ROS and RRF ships will be manned when needed.

100% Military Reserve Manning

This option would create new military reserve units, probably under MSC, to man each ROS and RRF ship. This would meet the military requirement to have crews ready and but has several disadvantages. The crews would have to have the correct training and experience. Even if a lack of training is compensated for with simpler equipment and larger crews, experience is still required. Officers and engineering department personnel would have to have sea time. Two weeks each summer and a weekend per month will not produce officers that can safely handle a ship if activated nor an engineering department that can keep an aging steam plant running. It may however, be adequate to sustain previously acquired skills. Thus this option would still require the recruitment of experienced personnel and more extensive drill time. Even if experienced personnel could be found, the costs would be large and politically this would be actively opposed by the labor unions.

Military Personnel to fill gaps in Civilian Crews

Filling randomly occurring shortfalls with active or reserve military personnel is too problematic to recommend. It assumes that there would be adequately trained and experienced military personnel available. Anyone who has commanded a Navy vessel or been a master of a civilian vessel can

imagine the leadership problems here. Naval personnel do not generally have any experience at the labor relations required with civilian crews. The civilian working environment and the military working environment aboard ship are considerably different. Randomly mixed crews on any large scale seems technically infeasible and undesirable.

Civilian Crews with Military Cadres

This concept envisions specialized military cadres that are trained for specific functions. Manning the radio billet with a military person offers several advantages. The RRF/ROS ships could have a standard, simple radio room installed with pre-wired racks. The equipment could be stored ashore for security and a better lay-up environment. It would then be quickly installed upon activation of the ship. The military member would train on standard equipment ashore, independent of a specific ship. A military radio operator also would add the additional capability of handling cryptographic material if encrypted communications are part of the suite (or encrypted global positioning signals, if used). In 1992, the international code requiring radio operators will be lifted. Most ships will shift to voice communications and these systems are being established and utilized. Radio operators will not be available from the merchant marine.

Enhanced sealift function cadres are already in use and could be expanded. These cadres would handle underway replenishment functions, special equipment like cranes, and any special manning required for seashed or flat track units (these allow a conventional container ships to handle outsized equipment like tanks). MSC already has reserve units for cargo handling and these could be expanded. This solves the problem that arises because modern ships rely increasingly on the cargo handling facilities of developed ports vice having this ability with the ship's equipment.

Some discussion has surfaced concerning enhancing the damage control (DC) ability of the RRF. The equipment cost is not large, but extra trained personnel to form DC parties are not available with normal manning. Military DC cadres could be added if the need is anticipated.

Non-Military Options

(1) Modern, diesel propelled ships should be purchased for the RRF as it increases to authorized strength. A careful look should be taken at the ships that were not activated for Desert Storm as well as some of those that were. If any are deemed of marginal quality, scrap them or transfer them to the NDRF and buy other ships. These actions would have a double benefit. The size of the required crew probably will decrease and the engineering experience required for the newer ship's crew (diesel) will be more readily available in the labor pool.

(2) Steps should be taken to reduce the crew size of ships where feasible. This offers several potential gains, but must be approached cautiously. Some options are easier than others. For example, the radio officer (a limiting billet during Desert Storm) could be replaced by a military augment or combined with existing deck officers.¹ Most other crew reductions require more effort or cost. Automated bridge systems and enginerooms are expensive. Unmanned enginerooms are feasible primarily on diesel plants. Multi-role crews would decrease manning requirements but require more extensive training.

The entire discussion of reduced crew manning has another subtle facet. Experience of foreign flag fleets clearly shows that as the manning level goes down, the required level of individual expertise and general crew experience as a team goes up. Therefore, where reduced crew sizes may be appropriate for civilian firms operating ships actively, it may have only limited applicability to a reserve fleet. In other words, a lower level of

individual and crew experience relative to their merchant marine counterparts for the reserve fleet when activated may have to be compensated for with increased crew size.

(3) Holding ships in ROS with caretaker crews, although relatively expensive, has many benefits. Experience with the FSS large (9 man) ROS crews shows that they greatly help the activation of the ship by providing a nucleus crew who is familiar with the ship, its idiosyncrasies, its spare parts, material condition, etc. A MARAD study observes for Desert Storm:

"Because of the nature of RRF ship lay-up and activation, it is critical to have the senior engineers arrive on day one or two of the activation. Many of these vessels had never been broken out of the RRF since original lay-up. Engineers must start up from cold iron and then work all the bugs out of the engineering plant prior to sailing. The fact that much of the engineering populace in the seafaring pool does not have much experience with the older steam plants which are predominant in the RRF ships is another critical factor. Hence, light off of a cold ship is a totally different situation than relieving the crew on an operational commercial vessel. These realities necessitate early arrival of senior engineers. In many cases, it was very difficult to find qualified senior engineering talent to crew these vessels."

The ROS concept would help greatly to alleviate this problem by having a nucleus crew that was experienced in cold iron light offs and experienced with the particular ship. The ROS crew also helps significantly in maintaining the material condition of the ship for activation. This option further serves to increase the number of merchant marine billets, thus increasing the labor pool.

The ROS concept could be expanded with a realignment of the readiness requirements for the RRF. 71 RRF ships are presently supposed to be maintained in 5 day readiness, 20 in 10 day readiness, and only 2 in 20 day readiness. Desert Storm showed that this does not reflect reality (see appendix B-2). A more realistic program might be to maintain the FSS, the

diesel RO/RO'S, and a few breakbulk ships in a 5 day readiness status, move the rest to half in 15 day and half in 30 day status. Then there could be one small ROS crew for each 5 day ROS ship and one ROS crew for "clusters" of four of the 15 and 30 day ships.

The ROS crews could have expanded responsibilities. This would tie in nicely with a later proposal for a merchant marine reserve. The ROS crew could be responsible for administering and training reservists assigned to their ship. They could be responsible for annual sea trials or at least dock trials (pier side light off, steaming, and testing of all equipment) for their ship. Additionally they could be in a reserve program to be sure they would be available for a nucleus crew if the ship is activated.

A Merchant Marine Civilian Reserve System

This system would be designed primarily to attract inactive mariners. These are trained mariners who either never were or are no longer in the Mariner pool in that they have full time jobs ashore and are pursuing other lines of work. It could however, also be used to keep active mariners, who will be serving primarily on diesel ships, current on steam propulsion plants. Major points include:

- Recruiting through incentive programs developed with the Maritime Unions, Ocean Carriers, U.S. Navy, and Federal & State Maritime Academies.
- Training using Union and Academies facilities.
- Allow the use of GI Bill for funding of training for military personnel.
- Annual cruises/training similar to the military reserve, including using RRF ships and participate in annual RRF "Breakout" exercises.
- Encourage active sailing with the Merchant Marine.
- Provide job protection similar to military reserves if called up.

The preliminary lessons from Desert Storm in the area of getting crews for activated ships indicate that job protection was a major issue with

mariners. There was no protection to insure that mariners could return to bullets after release from Desert Storm service. Many possible crew members were eliminated from consideration due to this. This type of job protection is used for military reservists and appears to be feasible for the merchant marine also.

Licensed participants would be encouraged to upgrade their licenses by higher retainer pay and higher pay if called up. They would upgrade their licenses as all other merchant mariners do, by Coast Guard examinations after acquiring the necessary experience and training. This would insure a properly qualified force unlike a military reserve system that would promote personnel based on time in grade.

This system also would use existing facilities and insure they are at least preserved. This would help insure the growth capacity required for a larger scale mobilization.

This option undoubtedly has high costs like a military reserve system but unlike the military reserve system, also would serve to preserve and enlarge the merchant marine manning pool.

Foreign_Mariners

Foreign mariners probably will be available from NATO countries especially Canada. Using them would require a waiver but it is certainly a contingency option that should be investigated to determine the approximate size of the labor pool and methods of tapping it. This source was utilized in World War Two.

V. WHY DEPEND ON UNITED STATES FLAG ASSETS FOR STRATEGIC SEALIFT?

Could the United States have conducted the strategic sealift for Desert Storm solely with US flag vessels? Probably, and also at nearly the same pace. Why wasn't this done? Why did the US pay a premium price on the world market instead? The US has funded a good portion of the US flag fleet for years in order to have the right to call them for just such a situation.

The reason given that appears to have the most merit is that if the US vessels were pulled off their regular routes to do Desert Storm, those routes would in many cases have been filled by competition from the international market. Then when the ships were done with Desert Storm, there would be no routes to go back to. This seems to have been the case with the British carriers (except the passenger ships) that were used in the Falkland conflicts. Few ships taken up from commercial service are under British registry today.

Another reason given is cost. MARAD has stated that it costs one to 1.5 million dollars to activate a RRF ship. It is estimated it will cost 2 million to lay up these ships when deactivated. Tankers are especially costly due to their mechanical fluid handling systems. Thus it was cheaper in some cases to get ships from the international market.

It is also misleading to think of chartering an entire vessel. This was often done but there is much more to it. Often the contract was to deliver goods to Saudi Arabia. This did not necessarily mean a specific ship picked up the cargo in the US and unloaded it in Saudi Arabia. Often the cargo was transferred in Mediterranean ports to shuttle ships that then delivered it to the Middle East. This is especially the case when the cargo only was a portion of the total ship's capacity. Other examples include "space available" deck space given by allies on vessels going to the gulf.

etc. It is more useful to say that 28% of the dry cargo (this excludes POL) for Desert Storm was transported by foreign flag vessels.

Looking to the future, there are several reasons why the US should maintain the indigenous capacity for sealift versus relying on the international market. Desert Storm showed that the US may find itself in competition with its coalition partners for world sealift assets when several countries are moving forces simultaneously. The size of our traditional NATO allies' fleets are also declining. This means that the countries most likely to use sealift will be even more dependent on the open market in the future.

The US also must consider the probability that future conflicts will not involve coalition partners who are major maritime nations or that the US may "go it alone." Any conflict in South America could fit this description. Desert Storm had only very minor restrictions placed on the use of foreign flag vessels by their countries, except in the case of Japan. This may not be the case in a South American conflict. The US needs to have sealift assets that will not be limited in quantity or type of cargo they are allowed to carry by foreign governments.

The RRF, if properly maintained, also will insure sufficient capacity is available as quickly as the US needs it. Some open market ships will be immediately available, but many will have to complete their voyages and transit to the US. Desert Storm was "no warning" and the US must be ready for future situations like this. Further a dedicated strategic sealift is faster. Commercial carriers averaged 33 days for cargo from the US to Saudi Arabia in Desert Storm. The RRF "sealift express" averaged 23 days. The difference is dedicating ships and not transferring cargo to shuttle ships as commercial carriers are set up to do.

Finally, it is recognized that some ships have unique characteristics that have no use in the world market, such as UNREP, crane ships, etc. It is already recognized that these special capabilities need to be maintained through ROS or RRF ships.

The US is a maritime nation. The power projection strategy for the "new world order" depends not only on naval control of the seas, but on the ability to transport the forces over the seas. The US cannot put itself in the position where it is seriously dependent on other nations for its strategic sealift. The decision to use non-US assets is a political decision with obvious risks. National Security Decision 28 recognized this stating:

. . . we must be prepared to respond unilaterally to security threats in geographic areas not covered by alliance commitments. Sufficient U.S. owned sealift resources must be available to meet requirements for such unilateral response.

VI. CONCLUSION

There will be a shortfall of mariners in the year 2000 for a major, single theater, limited mobilization conflict of the magnitude of Desert Storm by conservative estimates and there could easily be a large shortfall should the US merchant fleet decline faster than the COMMAD estimates. It is possible that the US merchant fleet could drop below 100 ships by the year 2000 instead of the 217 ships predicted by COMMAD. This would more than double the shortfall predicted by this paper.

COMMAD concluded there will be a large shortfall of mariners in the year 2000 for strategic sealift in the event of a global conflict. Their proposals center on solving this problem by reviving the U.S. Maritime industry through subsidy and protection and thus increasing the supply of available mariners. The political viability of this in an era of reduced budgets is questionable. This paper has examined sealift for a conflict on the order of Desert Storm. The proposed solutions are smaller scale and it is hoped, more pragmatic than COMMAD's.

Proposal

A combination of four options previously discussed is recommended. Two options serve to decrease the required merchant mariner manning and two increase the availability of manpower. Options that decrease the required number of mariners are:

- (1) Buy only diesel propelled, modern vessels to enlarge the force and replace ships shown to be in marginal condition or of little utility in Desert Storm. This simultaneously helps tailor the force to meet sealift requirements, increases the ease of lay-up and reactivation, and decreases the need for the dwindling pool of experienced steam plant engineering personnel. Modern ships also may be suitable for smaller crews.

(2) Use special purpose military cadres contingents. This allows MSC to train, fund, and tailor these cadres to the meet their military needs while leaving base crew manning to the merchant marine. This is being done now in some cases and other likely candidates are: Radiomen, UNREP augments, special cargo handling crews, and enhanced DC teams.

Options that would increase the availability of Mariners are:

(1) Man the RRF ships individually for the shortest readiness ships and in clusters for longer lead time ships with skeleton crews. This has the very large benefit of much easier activation due to improved material condition and a nucleus crew.

(2) Implement a merchant marine civilian reserve system.

Will it work?

Will this proposal work? It cannot be said with certainty that it will but it would bring about a substantial improvement. It can be said that if nothing comparable is done, it is certain that in the year 2000 the United States will not be able to man the ROS/RRF fleet and conduct a sealift operation of the magnitude of Desert Storm. These proposals are workable and provide a start toward avoiding this situation. The time for study is past and the United States should get started on a solution. These proposals should be tried and refined as experience is gained and trends develop. The proposals are a beginning of a basic, practical recipe for success that can be spiced up as the chefs gain experience.

APPENDIX A

GLOSSARY

APS	Afloat Prepositioning Ships - 12 ships of various types loaded with Army and Air Force material and operated by MSC. They are fully crewed at all times.
COMMAD	Commission on Merchant Marine and Defense - a body created by public law that has issued four reports on this topic.
Desert Shield	The operation from 2 August 1990 until 15 January 1991 during which U.S. forces were built up in the Middle East.
Desert Storm	The combat and post combat operation after January 15, 1991 in the Middle East
FSS	Fast Sealift Ships - Eight 30 knot ships in ROS in New Orleans operated by MSC. They are modified to handle Army tanks, vehicles, helicopters, etc.
MARAD	The Maritime Administration - a division of the Department of Transportation. Over half of their effort is involved with the RRF.
MPS	Maritime Prepositioning Ships - 13 ships in 3 squadrons operated by MSC in 3 locations world wide. Each squadron has the equipment to sustain a Marine Corps Expeditionary Brigade of 16,500 Marines for 30 days of combat. They are fully crewed at all times.
MSC	Military Sealift Command - among many other functions, operates the sealift ships which are held in reduced operating status.
NDRF	National Defense Reserve Force - a force of about 140 ships in lay up, over half of which were built at the end of World War II. Administered by MARAD.
ODS	Operating Differential Subsidy - a subsidy paid to U.S. flag carriers to make up the difference in operating costs vis-a-vis foreign carriers incurred due to U.S. regulations.
POL	Petroleum, oil, and Lubricants. This term is used

to distinguish this type of logistical support from the other major category, dry cargo (unit equipment, ammunition, food, etc.).

- ROS Reduced Operating Status - Some sealift ships are kept in this status with nucleus crews by MSC. They include the 8 FSS, 2 aviation support ships, and 2 hospital ships.
- RRF Ready Reserve Force - presently 97 ships of various types maintained in 5, 10, and 20 day readiness status in numerous U.S. ports by MARAD.

Sealift Enhancements:

Enhancements to RRF/ROS ships to increase their military utility. Significant among these are:

Flatrack Temporary decks that can be used on any container ship to carry outsized items like tanks.

Seashed A large shed that provides temporary decks in specially modified container ships for outsized items.

UNREP Underway replenishment - this can be accomplished from civilian ships to Navy ships by several methods:

Astern Refueling - a reel mounted astern refueling rig

Alongside Refueling - modifications to alongside refueling

UNREP Cargo Console - a STREAM rig to accomplish alongside UNREP of cargo

APPENDIX B-1

THE RECORD OF OPERATING STATUS SHIPS

FAST SEALIFT SHIPS (FSS)

Ship Name:	Year Built:	Propulsion:	Speed:	Dwt:*	Caretaker Crew:	Licensed: (Full Crew Size**)					Unlicensed:		Total:
						Deck:		Engine:	Radio:	Deck:	Engine:	Steward:	
Albatross	73.0	steam	33	26.1	12	4	5	1	10	11	11	42	
Altair	73.0	steam	33	25.6	12	4	5	1	10	11	11	42	
Antares	73.0	steam	33	24.2	12	4	5	1	10	11	11	42	
Ballistic	73.0	steam	33	25.9	12	4	5	1	10	11	11	42	
Capella	73.0	steam	33	25.4	12	4	5	1	10	11	11	42	
Genebola	73.0	steam	33	25.2	12	4	5	1	10	11	11	42	
Pallus	73.0	steam	33	24.2	12	4	5	1	10	11	11	42	
Perseus	73.0	steam	33	25.6	12	4	5	1	10	11	11	42	

Operation Logistics Support Ships (T-OLB)

Corvus	69.2	steam	23.6	13.6	7	4(5)	4(5)	1	9(10)	4(9)	4(6)	26(36)
Dauntless	70.1	steam	23.6	13.6	7	4(5)	4(5)	1	9(10)	4(9)	4(6)	26(36)

Hospital Ships**

Mersey	***	steam	17.0	69.3	17							68
Comfort	***	steam	17.5	69.3	17							68

Notes:

- * Displacement in thousands of tons.
- ** The crew size for FSS ships and the T-OLB's are from the Commission on Merchant Marine and Defense, Third Report. The number in parentheses for T-OLB's is the actual number used in Desert Storm, provided by MAR-250.
- *** The crew size for the hospital ships is mariners only, not medical personnel. Numbers were provided by MSC PHO.
- **** Mersey was converted in 1984 and Dauntless in 1985. They joined the fleet in 1986 & 1987 respectively.

1. The ship characteristics were compiled from the Third COMRAD Report, information provided by MARAD, and the USMIL Military Data.

[illegible]

Ship Name:	Ship Type: (see notes)	Readiness Status (days):	Activation Time (days):	Year Built:	Speed: (knots)	DUT:	Propulsion:	Licensed: (Crew Size):				Unlicensed:	Total crew:
								Deck:	Engine:	Radio:	Deck:	Engine:	Reward:
Gulf Venture	SS/CONT	5	5	68.4	18.5	13.0	steam	4	4	1	9	8	5
Gulf Blaker	SS	5		64.2	18.0	11.4	steam	5(6)	5(4)	1	10	8	31
Gulf Farmer	SS	10		64.2	18.0	11.4	steam	5	5	1	10	8	34
Gulf Merchant	SS	10	unk (note 3)	65.1	18.0	11.4	steam	5	5	1	10	8	34(n.4)
Gulf Shipper	SS	5	unk (note 3)	64.4	18.0	11.4	steam	5	5	1	10	8	34(n.4)
Gulf Trader	SS	5	14	64.3	18.0	11.4	steam	5(4)	5(4)	1	10(9)	8(7)	34(30)
Lake	SS	5	50	61.3	18.0	12.5	steam	4(5)	4(5)	1	9(10)	8(9)	29(36)
Northern Light	SS	5	5	61.3	18.0	12.5	steam	4	4	1	9	8	31
Pioneer Contractor	SS	5	5	63.2	21.0	13.5	steam	4	4	1	9	8	31
Pioneer Crusader	SS	5	5	63.4	21.0	13.5	steam	4	4	1	9	8	31
Prize Ans	SS	5	40	63.4	21.0	13.5	steam	4(5)	4(5)	1	9(10)	8(9)	29(36)
Scan	SS	10	64	63.1	18.0	12.4	steam	4	4	1	9	8(7)	29(30)
Southern Cross	SS	5	1	61.2	18.0	12.5	steam	4	4(5)	1	9	8(7)	29(32)
Cape Mace	SS/UNREP	5		62.2	18.0	12.5	steam	4	4	1	9	8	29
ADM Ma M Callaghan	RO/RO/CONT	20	23 (note 3)	69.3	23.6	15.7	steam	4(5)	4(6)	1	9(10)	5(9)	27(37)
Cape Decision	RO/RO	5	15 (note 3)	67.0	25.0	13.5	gas turb	4	4	1	9	6	28(n.4)
Cape Diamond	RO/RO	5	19	72.3	21.0	23.9	diesel	4	5	1	11(8)	5	32(27)
Cape Douglas	RO/RO	5	137	72.3	22.3	23.7	diesel	4	5	1	11(8)	5	32(27)
Cape Douglas	RO/RO	5	8	73.1	21.0	23.7	diesel	4	5	1	11(8)	5	32(27)
Cape Duxton	RO/RO	5	13	73.0	21.0	23.7	diesel	4	5	1	11(8)	5	32(27)
Cape Edmont	RO/RO	5	14	72.3	22.0	23.5	diesel	4	4(5)	1	9(10)	5(4)	27(30)
Cape Henry	RO/RO	5	14	71.0	19.0	20.2	diesel	4	4	1	9(10)	5(6)	27(31)
Cape Horn	RO/RO	5	5	79.2	20.0	31.5	diesel	4	4	1	9(10)	5(7)	27(34)
Cape Hudson	RO/RO	5	19	79.3	21.0	31.4	diesel	4	4	1	9(10)	5(4)	27(28)
Cape Inscription	RO/RO	5	5	76.2	23.0	19.1	steam	4	4(5)	1	9(10)	5(4)	27(30)
Cape Isabel	RO/RO	5	11	76.4	23.0	20.3	steam	4	4(5)	1	9(10)	5(7)	27(33)
Cape Lambert	RO/RO/CONT	5	60	73.3	19.0	20.2	diesel	4	4(6)	1	9	5(6)	28(31)
Cape Lebes	RO/RO	5	8	72.0	19.0	20.2	diesel	4	5	1	7(8)	5	27
Conat	RO/RO	5	15	58.1	18.0	10.1	steam	4	5(6)	1	9	5	26(27)
Jupiter	RO/RO	5	unknown	56.1	18.0	19.1	steam	4	4	1	9	8	32(33)
Meteor	RO/RO	5	5	67.2	23.0	12.3	steam	4	4	1	9(10)	5(7)	27(35)
Maine	SEATRAN	10	14	44.0	16.0	12.3	steam	4	4	1	10	8	33
Washington	T-ACS	5	unknown	44.2	16.5	12.3	steam	4	4	1	10	8	33(n.4)
Disland State	T-ACS	5	10	62.2	20.0	19.3	steam	5	6(5)	1	12	9(6)	42(35)
Equality State	T-ACS	unk	11	61.4	20.0	19.2	steam	5	6(5)	1	7(12)	6(8)	30(38)
Keystone State	T-ACS	5	5	66.2	20.0	13.6	steam	5	6	1	25	9	53
Sea State	T-ACS	5	5	66.1	20.0	13.6	steam	5	6	1	25	9	53
Grand Canyon State	T-ACS (note 1)	unk	note 2	65.4	20.0	13.6	steam	5	6	1	25	9	53
Green Mountain State	T-ACS	5	7	73.1	20.0	16.4	steam	5	5	1	14(10)	5(6)	35(33)
Gopher State	T-ACS	5	note 2	69.1	20.0	16.3	steam	5	5	1	14(10)	5(6)	35(33)
Plickertail State	T-ACS	5	17	69.2	20.0	16.3	steam	5	5	1	14(10)	5(6)	35(33)
Corpuscular State	T-ACS	5					steam	5	5	1			

Tankers:

Ship Name:	Ship Type: (see notes)	Readiness Status (days):	Activation Time (days):	Red: f (sts)	DWT:*	Propulsion:	Licensed: [Crew Size**]				Unlicensed:		Total crew:
							Deck:	Engine:	Radio:	Deck:	Engine:	Steward:	
Altana	AOG (gas)	10	13 (note 3)	8.0	4	diesel/elec	4	4	1	9	3	3	24
American Explorer	AO	10	11	8.0	24.2	steam	4	4	1	10	5	6	30
American Express	AO	10	11	8.5	34.7	steam	4	4	1	10	5	6	30
Chattahoochee	AOG	10	11	8.5	34.7	steam	4	4	1	10	5	6	30
Mission Buena Ventura	AO	5	6 (note 3)	6.0	4.9	diesel/elec	4	4	1	9	3	3	24
Mission Capistrano	AO	5	unk (note 3)	6.0	38.2	steam	4	4(5)	1	9(8)	4(5)	4	26(27)
Mount Vernon	AO (note 1)	unk	unk (note 3)	?	37.3	diesel	4	4	1	8	3	3	23(n.4)
Mount Washington	AO (note 1)	unk	?	?	?	?	?	?	?	?	?	?	?
Nodaway	AOG	10	1	8.0	4.0	steam	4	4	1	9	3	3	24
Potonac	AO	5	10 (note 3)	8.0	27.5	steam	4(5)	4(6)	1	10(13)	5(6)	6	30(37)
Shoshone	AO	1	10 (note 3)	8.0	26.5	steam	4	4(5)	1	9	6	5	29(30)

Passenger Ships:

Empire State	Troop/school	5	unk	8.0	8.8	? <th>4</th> <th>6</th> <th>1</th> <th>9</th> <th>6</th> <th>5</th> <th>31</th>	4	6	1	9	6	5	31
Patriot State (note 1)	Troop/school	5	unk	8.0	8.8	? <th>4</th> <th>6</th> <th>1</th> <th>9</th> <th>6</th> <th>5</th> <th>31</th>	4	6	1	9	6	5	31

Notes:

- * Displacement in thousands of tons
- ** The crew size is from the Commission on Merchant Marine p. Third Report.
- The number in parentheses is the actual number used in form provided by MAR-250, unless otherwise noted (see note 4)

Abbreviations for Ship Type:

- BB - Breakbulk
- COIT - Container
- LASH - Lighter Aboard Ship
- RO/RO - Roll On/Roll Off
- SEEBEE - See Barge Ship
- T-ACS - Container Ships fitted cranes for unloading land other ships in undeveloped ports.
- UNREP - Replenishment Capability (to a Military Force Ship)
- Alongside Underway

- Added to the RRF after the COMRAD Third Report, only participated.
- Activated but not employed as of 8 March 1991.
- Returned to MARAD control for repair or deactivation.
- Actual manning for Desert Storm is unknown.
- Readiness Status from "Logistics Handbook for Strategic Manning", Military Traffic Management Command, Newport News, VA
- A blank in the "Activation Time" column indicates that the ship was not activated for Desert Shield Storm.
- Activation time and actual manning provided by MAR-250 as of 1991.
- Ship status is updated from an internal MARAD SITREP as of 91.
- The ships the RRF and their characteristics were compiled from COMRAD Report, information provided by MARAD, and the U.S. Military Data Base.

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2. Ibid., Appendices, p. 64.

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